

User Applications Unique to Mobile Satellites

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As AMSC enters the market with its mobile satellite services, it faces a sophisticated user group that has already experimented with a wide range of communications services, including cellular radio and Ku-band satellite messaging.

AMSC's challenge is to define applications unique to the capabilities of its dedicated L-band satellite and consistent with the provisions outlined in its FCC license.

Through a carefully researched approach to its three main markets -- aeronautical, land-mobile, and maritime - - AMSC is discovering a wellspring of interest in corporate and general aviation, trucking companies, pipeline monitoring and control companies, maritime management firms, telecommunications companies, and government agencies.

This paper will provide a general overview of AMSC's FCC licence and corporate history, and discuss the specific applications unique to each user group.

Today's conference is a testament to the fact that there is tremendous interest within the scientific and governmental communities in mobile satellite services (MSS). For the American Mobile Satellite Corporation (AMSC), a

company on the cutting edge of this technology, a primary challenge is to succinctly define user applications so that the mass market will embrace this new technology.

Mass market acceptance of MSS should be of great interest to the government and scientific communities because of the accompanying decreases in mobile earth terminal, space, and ground segment charges that a large consumer and business user base will make possible.

As AMSC enters the MSS market, we face a relatively sophisticated user base that has already been exposed to satellite technology's mobile applications, albeit via systems that are not pure MSS in the L-Band. The Geostar and Qualcomm systems, for example, together have approximately 20,000 Ku-band land mobile satellite terminals on order. Qualcomm is the market leader in applications of satellite positioning and data messaging to the land-mobile sector, with 7,000 units deployed, primarily to large trucking companies, and Geostar follows with 2,000 units. These units are relatively low priced at a cost of under \$4,000 per unit. AMSC's mobile earth terminals, which will be available in November for beta testing, will be priced similarly.

Qualcomm and Geostar have achieved these numbers in just over two years, whereas the INMARSAT system needed 13 years to reach a deployment level of 10,000 mobile, primarily maritime, units, at a substantially higher cost of about \$30,000 to \$40,000.

As AMSC prepares to offer its low speed data messaging and position determination services in the fourth quarter of this year, our challenge is to define unique, value-added services that can serve our three principal markets: land-mobile, which includes trucking, private automobile, oil well drilling, pipeline management and government applications; maritime, which includes ships as varied as Coast Guard cutters, large and small yachts, and inland waterway barges; and aeronautical, which includes services for operational, administrative, and passenger communications.

Before looking at an overview of how AMSC will address these challenges, a review of AMSC's corporate history would be appropriate.

The mobile satellite technology that will be utilized in the AMSC system is an outgrowth of years of NASA experimentation with mobile satellite technologies, dating back to the 1970's.

NASA took the lead in identifying a market for MSS and later petitioned the Federal Communications Commission for frequency allocations. Industry interest in the U.S. was so intense that within a two year period, from 1983 to 1985, twelve applications for MSS service were filed at the FCC.

The FCC found that in order to use the limited MSS spectrum most efficiently,

the applicants should together form a consortium.

Eight of the original twelve applicants agreed with this principle, and in 1988 they formed the American Mobile Satellite Consortium, now known as the American Mobile Satellite Corporation. In 1989 AMSC received its FCC license authorizing it to function as a common carrier for the provision of domestic mobile satellite services to air, land, and maritime users.

AMSC functions in a unique environment. We at AMSC share the excitement and challenges common to many new companies, while at the same time we benefit from a corporate parentage of established, major telecommunications companies, namely Hughes Communications Mobile Satellite Services, Inc.; McCaw Space Technologies, Inc., a subsidiary of McCaw Cellular; MTEL Space Technologies Corp., the owner of the Skytel nationwide satellite paging system; Mobile Satellite Corporation; North American Mobile Satellite, Inc., whose parent company is Millicom Cellular; Satellite Mobile Telephone Company, Skylink Corporation, and Transit Communications, Inc. It's worth noting the large cellular and paging companies which are backing the development of L-Band mobile satellite services.

AMSC's FCC license authorizes us to operate three spacecraft to provide all domestic mobile satellite services -- land, sea, and air -- to users in the continental United States, Hawaii, Alaska, Puerto Rico, the Virgin Islands, and 200 miles of coastal waters. The AMSC license obligates AMSC to construct and launch a mobile satellite system that will serve as a national communications resource

for the United States of America.

Clearly, mobile satellite services offer universal coverage while moving. Not only will AMSC provide complete coverage of the U.S., even in rural and mountainous areas, but through an agreement with Telesat Mobile Inc., the Canadian operator of a domestic mobile satellite service, users will receive seamless service while on the go between Canada and the U.S. In addition, we are negotiating an agreement with the Mexican government to provide land mobile services. A seamless hand-off system will interconnect domestic aviation using the AMSC system and international aviation.

The AMSC satellites will be high capacity birds, with central load sharing and an effective EIRP much higher than in other mobile satellites. While the exact parameters of our satellite are still being defined, we anticipate that AMSC's MSAT 1 spacecraft will have a nominal power of 55 dBW.

AMSC will optimize usage of our space segment by offering service to a wide variety of user groups. We have defined several major applications that we are now actively marketing to our three major markets. In the land-mobile sector, these applications include emergency services, car theft prevention, interstate trucking, news gathering, oil exploration, supervisory control and data acquisition, and environmental monitoring. Aeronautical users will be able to benefit from services for passenger communication and cockpit data such as airline operational and administrative information. Many of the same applications common to the land-mobile market -- fleet management, passenger and employee

communications, and data transfer -- will be used in the maritime arena. The applications for this technology will continue to multiply as it is implemented, and users discover new solutions for recurring communications problems.

AMSC voice services feature toll quality, communications quality, and emergency services. A variety of data services facilitate the transmission of position reports and "canned" messages, short messages, maps, facsimiles, and forms.

A unique aspect of the AMSC system vis a vis other systems is our ability to establish private networks with private base stations and gateways to the public switched telephone network, public data networks, and other networks. It is through a private network that Rockwell International, our first service provider, will provide mobile satellite services to enhance an existing service, known as the Tripmaster system, that Rockwell markets to the trucking industry.

Data applications will be the hallmark of AMSC's pre-launch services, which we will introduce in the fourth quarter of this year. Services will feature 2-way data messaging at speeds of 300 bps from the mobile earth terminal to the satellite and 600 bps from the satellite to the mobile earth terminal, Loran-C for position determination, and a variety of transmission options, including scheduled, unscheduled, and variable length.

The long-haul trucking industry is one of our main markets for data services. Data messaging applications in the trucking industry include fleet management systems, expert systems for dispatch and other operations, customer

service, real-time billing, real-time crediting to drivers, and emergency road services. Data messaging and position location services also will be available after the late 1993 launch of our satellite, which will provide two-way voice and high speed data services. We will tailor our services and support systems, such as network control and earth station facilities to the individual needs of each customer. Our four primary service packages are full period channel, shared channel, virtual circuit, and packet network. The full period channel service provides customers with dedicated channels, and the customers themselves provide the earth station and network control center. With shared channel service, AMSC provides customers with virtual network service, fixed period circuits, and demand capacity. The customer provides the earth station. Virtual circuit service provides full voice capabilities and interactive data at speeds up to 9600 bps on a call per minute basis. Our packet network service provides standard 128 byte packets and broadcast messages for mobile response.

AMSC's voice services will not directly compete with cellular services, but will supplement cellular coverage in areas where it is not readily accessible, such as rural areas and remote industrial sites. Our North America-wide voice coverage will enable a car phone's coverage range to leap from a local cell across the continent, forming a seamless, continental cell. AMSC's provision of both voice and data services also will allow long-haul transportation companies, such as trucking, bus, and railroad operators to access a wide range of services not available via conventional cellular phones.

Through AMSC's private networks, users have direct access to satellite capacity for voice and data communications. Via this direct access system, they can operate a network of one or more private base stations which operate separately from the public mobile network and feature interconnection to the public switched telephone network. This system allows our customers to take advantage of economies of scale available through management of their own networks while at the same time benefiting from access to our space segment.

According to our FCC license, AMSC is obliged to provide priority and pre-emptive access to our space segment for aviation flight safety. Our services will feature an interface to FAA facilities for voice and data communications, and compatibility with Arinc 741, as it is adopted. Communications with government and other aircraft will facilitate air traffic control, operations, administrative, and passenger communications.

Government interest in our services is strong. In addition to government aviation applications, government agencies will use our services to improve emergency search and rescue operations; to enhance communications during sensitive law enforcement actions; to monitor dams and reservoirs; and for Coast Guard operations.

Under the terms of our launch agreement with NASA, certain government agencies will receive free experimental capacity on our satellite for a fixed period of time. NASA and AMSC sponsored a government seminar in March, at which nearly 38 agencies met to discuss their applications needs. We're witnessing a tremendous outpouring of interest in our services.

We also hope to integrate our services into the new FTS 2000 phone system that the U.S. government is implementing.

To summarize, I would like to reiterate that insofar as the data market is concerned, we see AMSC's unique service offerings as stemming from our ability to establish private networks that offer entrepreneurial service providers the opportunity to bundle their services with ours, thereby offering a new services. AMSC is embarking on a value-added program to work with service providers in the aeronautical, SCADA, maritime, and trucking markets.

With regard to the voice market, we see AMSC as a service that will complement and supplement cellular service, reaching areas even more remote than the 428 Rural Statistical Areas that are slated to receive cellular services.

The applications that I have outlined for you today represent a true revolution in the way North Americans will communicate and the way our businesses will be run. This is just the beginning. As we continue to tell our story to users throughout our country, we are finding new, niche market applications that we had never before envisioned. The market for AMSC's services is fast-growing and ever-changing, and I look forward to keeping you apprised of our successes.